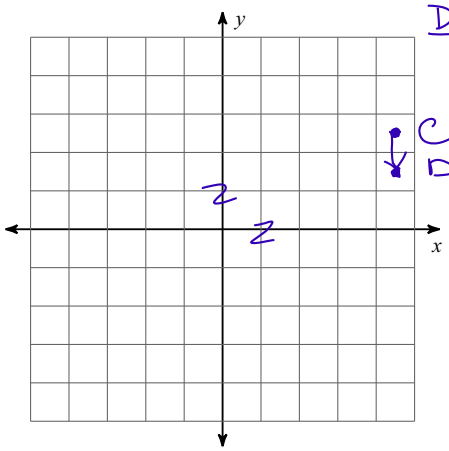
Precalculus Name_____

Vectors Intro Notes

Date_____ Period____

Find the following information for each vector: Graph, component form, linear combination, magnitude and direction angle.

1) $\overrightarrow{CD}$ where $C = (9, 5)$ $D = (9, 3)$



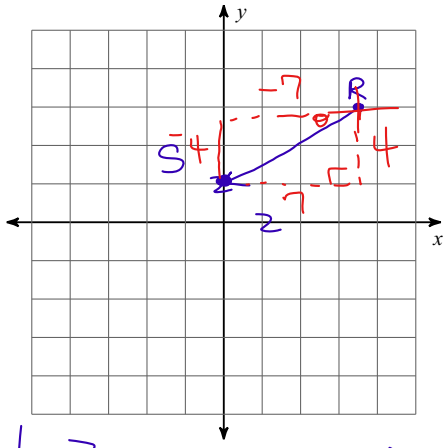
Direction
i) 270°
ii) S
iii) -90°

$\overrightarrow{CD} = \langle 0, -2 \rangle$ component form

$\overrightarrow{CD} = 0i - 2j$ linear combo

magnitude → $|\overrightarrow{CD}| = 2$

2) $\overrightarrow{RS}$ where $R = (7, 6)$ $S = (0, 2)$



$\overrightarrow{RS} = \langle -7, -4 \rangle$ or $-7i - 4j$

magnitude → $|\overrightarrow{RS}| = \sqrt{7^2 + 4^2} = \sqrt{65}$

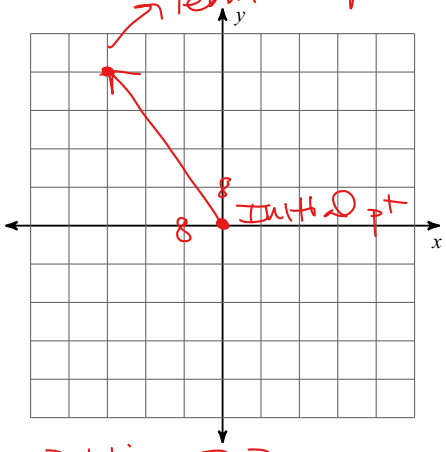
$\theta = \tan^{-1}\left(\frac{-4}{-7}\right) \approx 29.745°$ S of W

or $209.745°$

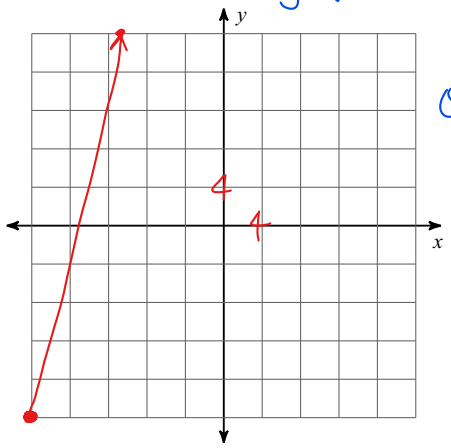
Find the following information for each vector, if not provided in the question: Graph, linear combination, magnitude and direction angle.

24 → 3
32 → 4
40 → 5

3) $\mathbf{v} = \langle -24, 32 \rangle$



4) $\mathbf{a} = \langle 9, 40 \rangle$



LC $9i + 40j$

mag $\sqrt{81+1600} = \sqrt{1681} = 41$

$\theta = \tan^{-1}\left(\frac{40}{9}\right)$

$= 77.320°$

NofE

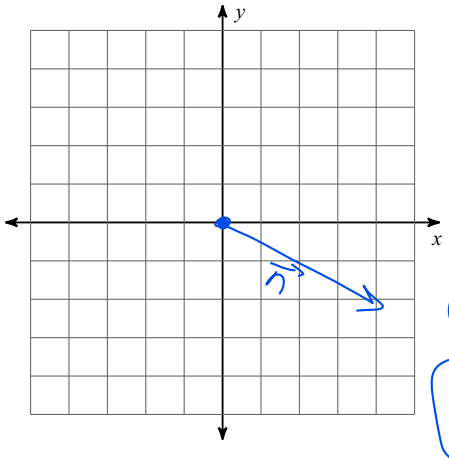
LC $-24i + 32j$

Magnitude $|\vec{v}| = \sqrt{24^2 + 32^2} = 40$

$\theta = \tan^{-1}\left(\frac{32}{-24}\right) \rightarrow 53.130°$ NofW or $126.87°$

Find the following information for each vector, if not provided in the question: Graph, component form, linear combination.

5) $|\mathbf{n}| = 98, 330°$



component form

$\langle \text{mag}\cos\theta, \text{mag}\cdot\sin\theta \rangle$

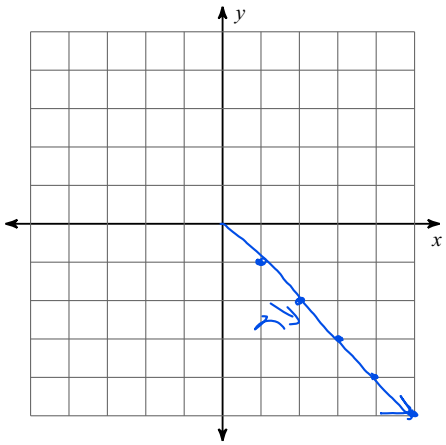
(assuming θ as the (positive) x-axis angle)

comp form $\vec{n} = \langle 98\cos 330°, 98\sin 330° \rangle$

$\vec{n} = \left\langle \frac{98\sqrt{3}}{2}, -98\,\frac{1}{2} \right\rangle$ or $\langle 49\sqrt{3}, -49 \rangle$

LC $49\sqrt{3}\,\mathbf{i} - 49\,\mathbf{j}$

6) $|\mathbf{r}| = 47, 315°$



$\vec{r} = \langle 47\cos 315°, 47\sin 315° \rangle$

$= \left\langle \frac{47\sqrt{2}}{2}, -\frac{47\sqrt{2}}{2} \right\rangle$

$\vec{r} = \frac{47\sqrt{2}}{2}\,\mathbf{i} - \frac{47\sqrt{2}}{2}\,\mathbf{j}$

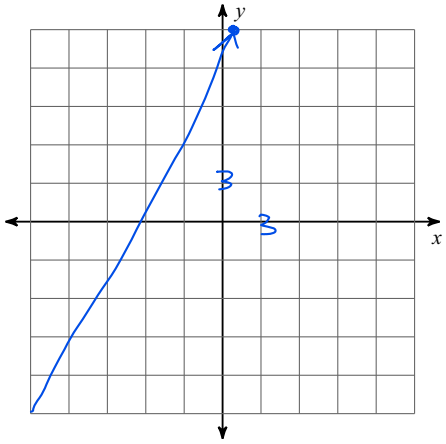
16 → 8

30 → 15

34 → 17

Find the following information for each vector, if not provided in the question: Graph, component form, magnitude and direction angle.

7) $16\mathbf{i} + 30\mathbf{j}$ $= \vec{r}$



$\vec{r} = \langle 16, 30 \rangle$

Mag $\sqrt{16^2+30^2} = \sqrt{1156} = 34$

$\theta = \tan^{-1}\left(\frac{30}{16}\right) = 61.928°$ N of E

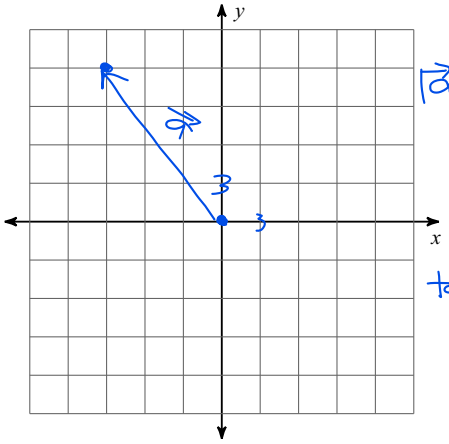
9 → 3

12 → 4

15 → 5

8) $-9\mathbf{i} + 12\mathbf{j}$ $= \vec{a}$

$\vec{a} = \langle -9, 12 \rangle$



$|\vec{a}| = \sqrt{9^2+12^2}$

$= \sqrt{81+144}$

$= \sqrt{225} = 15$

$\tan^{-1}\left(\frac{12}{9}\right) = 53.130°$

N of W

or

126.87°

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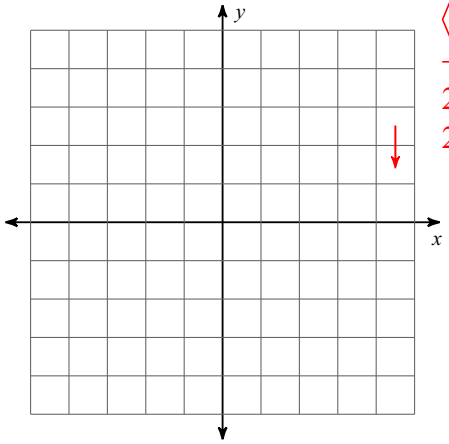
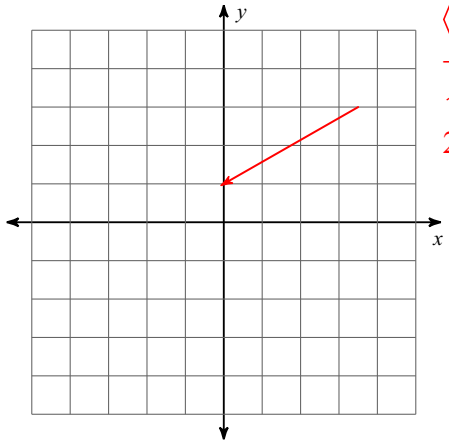


$\langle 0, -2 \rangle$
$-2\mathbf{j}$
2
270°

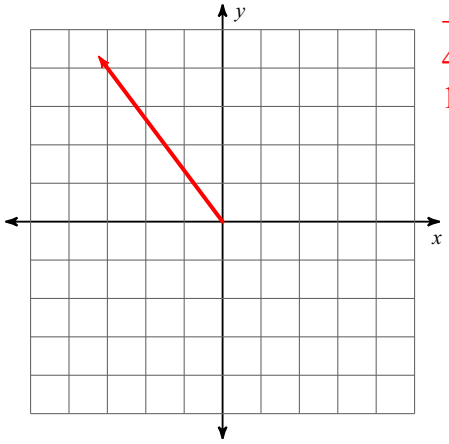
2) $\overrightarrow{RS}$ where $R = (7, 6)$ $S = (0, 2)$



$\langle -7, -4 \rangle$
$-7\mathbf{i} - 4\mathbf{j}$
$\sqrt{65} \approx 8.062$
209.74°

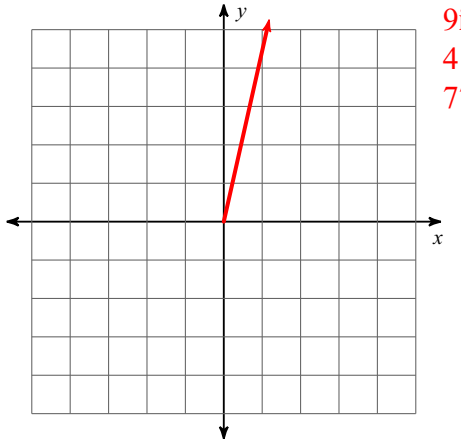
Find the following information for each vector, if not provided in the question: Graph, linear combination, magnitude and direction angle.

3) $\mathbf{v} = \langle -24, 32 \rangle$



$-24\mathbf{i} + 32\mathbf{j}$
40
126.87°

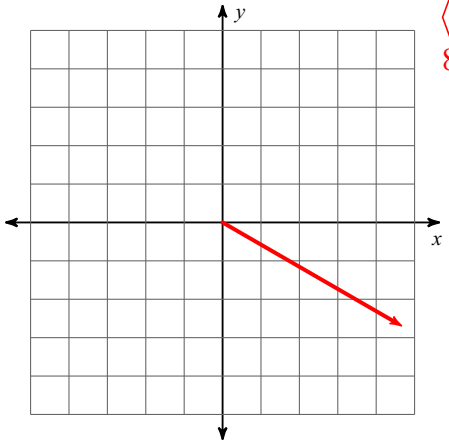
4) $\mathbf{a} = \langle 9, 40 \rangle$



$9\mathbf{i} + 40\mathbf{j}$
41
77.32°

Find the following information for each vector, if not provided in the question: Graph, component form, linear combination.

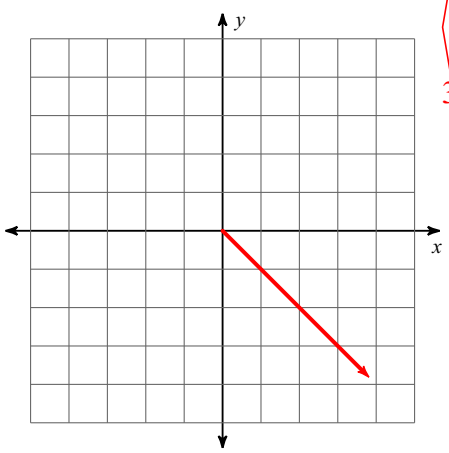
5) $|\mathbf{n}| = 98, 330°$



$\langle 49\sqrt{3}, -49 \rangle$

$84.87\mathbf{i} - 49\mathbf{j}$

6) $|\mathbf{r}| = 47, 315°$

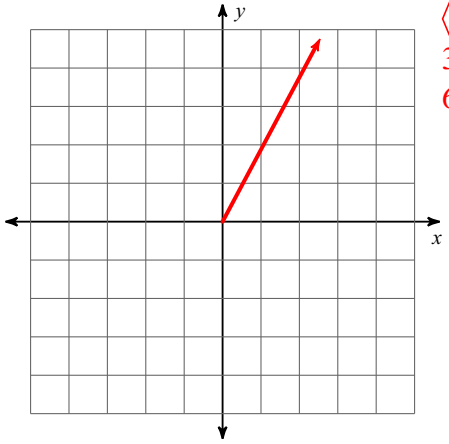


$\left\langle \frac{47\sqrt{2}}{2}, -\frac{47\sqrt{2}}{2} \right\rangle$

$33.234\mathbf{i} - 33.234\mathbf{j}$

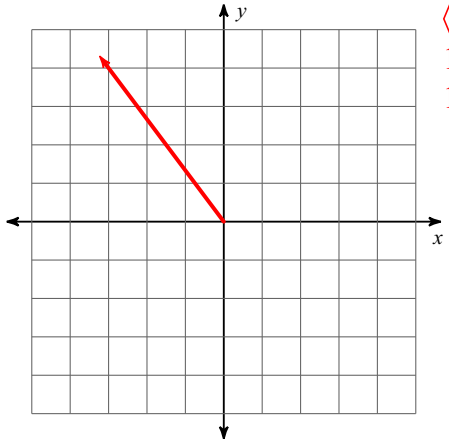
Find the following information for each vector, if not provided in the question: Graph, component form, magnitude and direction angle.

7) $16\mathbf{i} + 30\mathbf{j}$



$\langle 16, 30 \rangle$
34
61.93°

8) $-9\mathbf{i} + 12\mathbf{j}$



$\langle -9, 12 \rangle$
15
126.87°